Remarks

The final Office Action dated February 21, 2008 and the Advisory Action dated April 30, 2008 have been carefully considered. Claim 29 has been amended for clarification without adding new matter. Reconsideration of the current claims in view of the following remarks and the attached Affidavit by Dr. Ahmed is respectively requested.

Claim Rejections

In the Continuation Sheet of the Advisory Action, the Examiner maintains the rejections of the claims as set forth in the final Office Action dated February 21, 2008 wherein claims 3-6, 8-10, 14, 15, 17-19, 29, and 32 were rejected under 35 U.S.C. 103(a) as being unpatentable over Gartner *et al.* (WO 98/49221; equivalent U.S. 6,323,252) in view of evidence provided in Wilson (U.S. 6,579,958) and Aberson *et al.* (U.S. 4,548,847).

In the final Office Action, the Examiner asserts that Gartner et al. discloses superabsorbent particles that, after heat treatment, have been surface treated with an aqueous solution of multivalent metal salt (claims 1, 3, 8) and that this type of crosslinking is a reversible phenomenon. In addition, the Examiner asserts that the superabsorbent disclosed in Gartner et al. is substantially the same as described in the instant claims. Furthermore, the Examiner further asserts that Inger et al. discloses superabsorbent particles that, after heat treatment, have been surface treated with an aqueous solution of trivalent metal salt and that this type of crosslinking is a reversible phenomenon. In addition, the Examiner asserts that the superabsorbent disclosed in Inger et al. is substantially the same as described in the instant claims.

In the Advisory Action, it is stated that a *prima facie* case of obviousness was established in view of the secondary references, Wilson and Aberson et al., which point to reversibility of cationic crosslinking of multivalent ions. It is then stated, that the bonding is reversible suggests that ions are removable, and it follows that when removed, the condition indicated in the claim, the polymer exhibits the same property.

With all due respect to the Examiner, it will be shown herein that a *prima facie* case of obviousness has not been established. In brief, the *prima facie* case of obviousness is not established because removing the ions or coating from the absorbent polymer particles of either Gartner et al. or Inger et al. would destroy the invention therein, and that neither Wilson nor Aberson et al. disclose or suggest removing a salt coating from a surface of absorbent polymer particles. In addition, Wilson specifically discloses not to use a coating for a superabsorbent polymer having a slow rate of absorption (col 2, lines 52-57), and Aberson et al. requires the use of a removal agent with the multivalent cation to reverse the crosslinking. The Affidavit by Dr. Ahmed attached hereto as APPENDIX A explains and supports the technical position set forth herein, and is incorporated by reference into the present remarks.

The present invention specifically discloses that it is the salt coating of (d) that is washed off the surface crosslinked superabsorbent polymer particulate, not the ions as asserted by the Examiner. The salt coating is defined in the current claims as containing salt selected from a group consisting of monovalent salts, divalent salts, trivalent salts and higher salts coated onto the surface of the superabsorbent polymer particles.

The *prima facie* case of obviousness set forth by the Examiner relies on the assumption that the ions on the surface of the superabsorbent polymer in Gartner et al. can be removed. First, this assumption is incorrect because the present invention, as set forth in the current claims states that it is the salt coating (d) that is removed, not the ions on the surface as stated by the Examiner in the *prima facie* case of obviousness. Second, not only does Gartner et al. not disclose or suggest that the aqueous additive coating or ions be removed from the surface, such a removal contradicts the disclosure of Gartner et al. In particular, Gartner et al. states that the "*invention provides remoisturized polymer particles having additives distributed more homogeneously throughout their surface.*"

The coating in Gartner et al. is an aqueous additive solution as set forth from Col. 3 line 51 to Col. 4 line 23. At least a portion of the aqueous additive solution migrates into the polymer, which would foil any attempt to wash the coating off the surface. Gartner et al. discloses treatment of the surface of the SAP particles to overcome various problems associated with very dry SAP. Gartner et al. includes an aqueous coating that must remain on the superabsorbent polymer in order for the superabsorbent particles to have the requisite properties set forth therein.

Inger et al. discloses a surface crosslinked superabsorbent particle that is reacted with the solution of at least one salt of an at least trivalent cation. Inger et al. fails to disclose that the coating as set forth in part d) of claim 29 is washed off as set forth in the present claims resulting in the superabsorbent particles having different absorption properties.

The *prima facie* case of obviousness as set forth by the Examiner relies on an interpretation of Wilson and Aberson et al. that these references disclose reversibility of cationic crosslinking of multivalent ions. In fact, Wilson and Aberson et al. disclose reversibility of cationic multivalent ions in a specific fact pattern. It will be shown in the attached affidavit that neither Wilson nor Aberson et al. disclose or suggest removal or reversibility of a salt coating in order to remove the salt coating from the surface of the superabsorbent polymer particulate as set forth in the present claims.

Wilson discloses the crosslinking is added in the polymer such that the polymer includes covalent crosslinks and reversible cationic crosslinks wherein the metal is distributed essentially homogeneously throughout the polymer particles. Dr. Ahmed sets forth in the attached Affidavit how the term "reversible" as used in Wilson implies that one ion (not a salt) exchanges with another ion. In Wilson's invention, the multivalent cation was homogeneously placed throughout the polymer and this ion exchanges with a lower-valent ion such as sodium that is contained in various fluids such as body fluid, sea water, etc. in order to allow the polymer chain to extend easily to absorb fluid. In addition to Dr. Ahmed's comments, Wilson specifically teaches not to use a cation removing agent or a coating for the polymer. In summary, Wilson does not disclose or suggest a coating that may be washed off the surface of the superabsorbent polymers, and Wilson specifically teaches not to use a coating, as required by the present invention.

Aberson et al. discloses the delay absorption in which an anionic polyelectrolyte is reversibly crosslinked with a polyvalent metal cation and a removal agent for the crosslinking agent wherein when an aqueous fluid contacts the absorbent system. Since the anionic

polyelectrolyte is cross-linked with the polyvalent metal cations, swelling is inhibited and the water-containing fluid is able to penetrate and permeate the absorbent. The aqueous fluid dissolves the water-soluble removal agent, following which the dissolved removal agent removes the polyvalent metal cations cross-linking the anionic polyelectrolyte, the uncross-linked anionic polyelectrolyte then may absorb the water-containing fluid and swell. That is, once polyvalent cations cross-linking the anionic polyelectrolyte are removed by the complexing agent, swelling of the anionic polyelectrolyte can proceed.

Aberson et al. is not directed to coating superabsorbent particles, nor is it directed to removing a salt coating from the surface as set forth in the current claims. This is set forth in Dr. Ahmed's attached affidavit. Aberson et al. is directed to internal crosslinking of superabsorbent polymer hydrogel with a polyvalent metal cation wherein the hydrogel may be combined with a removal agent for making the hydrogel uncrosslinked as set forth in column 3, lines 15 to 41. Specifically, the function of the removal agent is to form a complex with the crosslinking agent, thereby removing it as a cross-linking material and substantially restoring the aqueous absorbing properties of the hydrogel. Basically, the removal agent makes the hydrogel into an uncrosslinked polymer, which teaches away from, and destroys the superabsorbent particles of the present claims.

In view of the foregoing comments, it has been shown that Gartner et al. and Inger et al. fail to disclose all the elements of the current claims, and that Wilson and Aberson et al. fail to disclose the fact that a coating may be washed off the surface of the superabsorbent polymers as suggested by the Examiner. Furthermore, removal of the coating from Gartner et al. would destroy the invention of Gartner et al. In view of these comments, the rejection of claims 3-6,

8-10, 14, 15, 17-19, 29, and 32 under 35 U.S.C. 103(a) as being unpatentable over Gartner et al. in view of evidence provided in Wilson and Aberson *et al.* should be withdrawn; and the rejection of claims 3-6, 8-10, 14, 15, 17-19, 29, and 32 under 35 U.S.C. 103(a) as being unpatentable over Inger et al. in view of evidence provided in Wilson and Aberson et al. should be withdrawn.

Conclusion

In light of the foregoing remarks and amendments to the claims, Applicants believe that the present application is now in condition for allowance, and such action is respectfully requested. If any issues remain unresolved, the Examiner is invited to telephone Applicants' counsel at the number provided below.

Respectfully submitted,

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APPENDIX A

(Affidavit of Dr. Ahmed)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Iqbal Ahmed *et al.*
Serial No.: 10/706,569 Art Unit: 1796
Filed: 12 November 2003 Examiner: LEE, Rip A.
Confirmation No.: 6659

For: **SUPERABSORBENT POLYMER HAVING DELAYED FREE WATER ABSORPTION**

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AFFIDAVIT UNDER 37 C.F.R. 1.132

I am Iqbal Ahmed. I hold a BS with Honors in Chemistry from University of Chittagong, Bangladesh; a MS in Applied Chemistry from University of Dhaka, Bangladesh; and a PhD from North East London Polytechnic, London, England, and I specialized in the area of Polymer Chemistry. Upon completion of my PhD in December 1981, I immigrated to the U.S.A. in June 1982. I started working in the field of water-soluble polymers as a Post Doctoral Research Associate in the Chemistry Department, University of Lowell, Lowell, MA. I joined Phillips Petroleum Company located in Bartlesville, OK as a Research Associate Chemist and started working in the field of water-soluble/hydrogel/superabsorbent polymers in 1987 and continued working in this field to the present. Since June 1, 1999, I have been employed as a Senior Research Scientist by Stockhausen Inc. located in Greensboro, NC.

I am a joint inventor of the present application. I have reviewed and studied Gartner *et al.* (WO 98/49221; equivalent U.S. 6,323,252) in view of evidence provided in Wilson (U.S. 6,579,958) and Aberson *et al.* (U.S. 4,548,847) in view of the statements in the Office Action dated April 17, 2008 and the Advisory Action dated April 30, 2008. Even though Wilson or

Aberson disclose reversibility of cationic crosslinking I disagree that this would apply to the present invention for a number of reasons, as set forth below.

Gartner et al. is directed to absorbent polymer particles wherein the particles have been remoisturized, after heat treatment, with an aqueous additive solution containing a mono- or multivalent metal salt wherein the absorbent particles have certain absorption properties. The aqueous additive solution is added to the absorbent polymers to overcome various problems including preventing agglomeration of the absorbent particles.

Wilson discloses that the internal crosslinking material is added such that the polymer includes covalent crosslinks and reversible cationic crosslinks wherein the metal is distributed essentially homogeneously throughout the polymer particles. The term "reversible" as used in Wilson, implies that one ion (not a salt) exchanges with another ion. In Wilson's invention, the multivalent cation was homogeneously placed throughout the polymer and these ion exchanges with a lower-valent ion such as sodium that contained in various fluids such as body fluid, sea water, etc. in order to allow the polymer chain extend easily to absorb fluid. The ion exchange takes time and hence slows down the overall absorption rate of the polymer. That was the purpose of Wilson's invention. This does not imply or suggest that a salt coating on the surface can be washed off the surface of the polymer as suggested by the Examiner. Our current invention is not meant to slow down the over all absorption rates of neither polymer nor of absorbent core made with polymer and fiber which is contrary to Wilson. Therefore, Wilson does not disclose or suggest that a salt-coating can be washed off the surface of a superabsorbent polymer with water.

Aberson et al. is not directed to salt-coating superabsorbent particles, nor is it directed to removing a salt-coating from the surface as set forth in the current claims. Aberson et al. is directed to internal crosslinking of superabsorbent polymer hydrogel with a polyvalent metal cation wherein the hydrogel may be combined with a removal agent for making the hydrogel uncrosslinked as set forth in column 3, lines 15 to 41. Specifically, the function of the removal agent is to form a complex with the crosslinking agent, thereby removing it as a cross-linking material and substantially restoring the aqueous absorbing properties of the hydrogel. This complex formation also takes time and hence slows down overall rate of absorption. Basically, the removal agent makes the hydrogel into an uncrosslinked polymer, which teaches away from, and destroys the superabsorbent particles of the present claims. Therefore, Aberson et al. does not disclose or suggest that a salt-coating can be washed off the surface of a superabsorbent polymer with water.

I declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements are made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under 18 U.S.C. 1001; and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Iqbal Ahmed

Dr. Iqbal Ahmed

Date: 5/21/08